

# PATENT SPECIFICATION

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## PROVISIONAL SPECIFICATION

### Improvements in Pipe Couplings

I, PERCIVAL EDWARD THOMAS, a British Subject, of 7, Killester Gardens, Worcester Park, Surrey, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in pipe couplings and has for its object to provide an improved construction of pipe coupling that is self sealing against egress of the fluid carried on disconnection, but on recoupling the sealing devices are displaced to admit of fluid flow. The self sealing devices are constituted by spring loaded valves, one in each coupling part, and which operate to seal in absence of mutual contact.

A further object of the invention is to reduce to a minimum the inclusion of air on recoupling and also to provide the minimum of impedance to fluid flow within the coupling parts when in their connected state.

In application the coupling parts may be disposed each on separate pipe terminals, or one coupling part connected to a fluid containing tank reservoir or the like and the counterpart coupling on pipe terminal connected thereto.

Further, the pipe connecting devices forming part of the coupling may be of a type for application to metallic conduits, or for application to flexible or like non-rigid pipes. In either form the separate coupling parts are allowed to be drawn together by a screwed union nut of normal type.

The invention consists in a self sealing bipart pipe or reservoir coupling wherein the sealing devices are displaced upon connection characterised that the one or first part has a circular spring loaded valve engaging a peripheral seating, whilst the second or counter part has a spring loaded annular sealing valve having a peripheral seating internally and externally of the annulus, said valve of the second or counterpart being displaced on coupling by the seating of the first part, and the valve of the first part displaced by the inner seating of the second part; constructively and in a preferred form the valve of the first said part is guided by a tubular entity forming a spring housing and is

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part of a perforate transverse spider, whilst the valve of the counterpart is aligned by a supporting flanged ring acting as an abutment for the valve spring, the opposed abutment for said spring being a foot ring forming part of or fast with a spider, the latter terminating in a disc whose perimeter forms the seating for the inner surface of the counterpart annular sealing valve. Thus on coupling, the valve of the first part is forced inwards guided by the tube of its supporting spider, the said valve contacting the central disc of the counterpart, whilst the annular valve of the counterpart is forced inwards by the annular concentric seating of the first part, thereby permitting when the parts are fully coupled of free fluid flow through the body of the completed coupling and interstices of the spiders in the respective portions.

The valve of the first part is a metal entity stream lined to the internal contour of the flow passage of the coupling part having an annular valve face sealing ring of suitable flexible or like material that engages as aforesaid a peripheral seating in the coupling part housing. To prevent the annular valve face sealing ring canting, it is recessed into the valve body, and its inner surface is supported by an outer applied rigid disc.

The spider with its tubular central guide and spring chamber is supported on an internal flange of the first part coupling body and locked in position by a threaded socket carrying the conduit or pipe to which it is permanently or detachably secured.

With regard to the second coupling part the annular valve member consists of a cup packing having an outer side part contacting the wall of its housing and a part at right angles to said outer side which forms the annulus or working contact face of the valve. Said valve is seated on one or more discontinuous flat steel thin rings, which lie over the top of the before-mentioned valve guide. The said valve guide constitutes one abutment of the valve spring, the other abutment being a groove in the foot ring of the central counterpart coupling spider. The outer

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wall of the said spider foot ring is elongated and spun into a cavity within the valve housing, thus locking the said spider into a position of fixity.

5. The thin split annular sheet steel rings employed as seatings for the valve are employed to give a planar sealing of the valve face which is in floating relationship to its sealing. Said rings have  
10 incised bent over portions which locate and lock them in position upon the spring guide and also hold the valve seating in position. The annular spring guide, the flat steel rings and the valve seating can  
15 all be inserted in the counterpart housing after assembly of the latter with the central spider in position. Although the annular split flat steel rings are larger in width than the space they help to seal,

they can be inserted by opening the slit 20 and threading them in the annular slot at an angle, care being taken that in the final adjustment, the points where they are so split do not coincide.

The first coupling part housing is provided with a flange in contact with which is provided a screwed coupling nut, the latter being threaded and engages a like threaded external portion of the counterpart so that on turning said nut the two coupling portions are drawn together or  
30 *vice versa*.

Dated this 12th day of June, 1944.

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## COMPLETE SPECIFICATION

### Improvements in Pipe Couplings

1. PERCIVAL EDWARD THOMAS, a British Subject, of 7, Killester Gardens, Worcester Park, Surrey, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

- 40 This invention relates to improvements in pipe couplings and is pertinent to that class of self-sealing spigot-and-socket pipe coupling wherein a fixed seating and mobile valve of one part co-operate with  
45 like members of the other part to open the pipe to fluid flow upon coupling and seal each pipe extremity against fluid egress when uncoupled, and has for its object to provide an improved construction of pipe  
50 coupling that is self sealing against egress of the fluid carried on disconnection, but on recoupling the sealing devices are displaced to admit of fluid flow. The self sealing devices are constituted by spring  
55 loaded mobile valves, one in each coupling part, and which operate to seal in absence of mutual contact.

- A further object of the invention is to reduce to a minimum the inclusion of air on recoupling and also to provide the minimum of impedance to fluid flow within the coupling parts when in their connected state.

- In application the coupling parts may be disposed each on separate pipe terminals, or one coupling part connected to a fluid containing tank reservoir or the like and the counterpart coupling on pipe terminal connected thereto.

- 70 Further, the pipe connecting devices forming part of the coupling may be of a

type for application to metallic conduits, or for application to flexible or like non-rigid pipes. In either form the separate coupling parts are allowed to be drawn together by a screwed union nut of normal type.

A further object of the invention is to avoid in large degree fine limits or very accurate machining to achieve alignment of the valve and valve seatings which has heretofore produced difficulties in the above type of self sealing couplings wherein metal to metal faces are depended on for sealing.

The invention embraces means to overcome this difficulty by providing resilient facings for engagement of the valves and their respective seatings and at the same time eliminates in large degree annular packing material and sealing devices often pertinent to known types of coupling members.

The invention consists in a self sealing bipart pipe coupling of the type set forth characterised in that a resiliently faced valve member of the spigot part is adapted to engage a static valve seating of the socket part on coupling, and engage the under face of a double faced fixed seating on said spigot part when the coupling is uncoupled, the mobile valve member of the socket part being continuously in resilient contact with a reinforced cup shaped resilient mobile packing ring, said ring being adapted to rest upon the upper face of the spigot fixed seating when the coupling is coupled and to support the said continuously contacting valve and engage fixed annular seatings on said 110

socket part to seal and close said socket part when the coupling is uncoupled.

In construction and according to the invention the two parts of the coupling, herein referred to for the sake of distinction as spigot part A and socket part B are characterised in that each valve seating has two separate seatings or valve seat faces, one face for the valve of its own part, and on coupling for fluid flow, one for its counterpart valve. The valve faces that procure a fluid tight joint are of a flexible type unaffected by oil or hydrocarbon spirit such as synthetic resin or rubber and pressure spreading devices may be employed when there is a tendency for the flexible facing to spread under the continuous thrust of the contact compelling springs. The part A and B of the coupling may be drawn together by a union cramp nut or kindred device and during the operation of coupling the flat valve surfaces of each part are caused to first abut, and with their seatings when so abutting the union cramping device is threaded home to lock the parts together. In this manner there is no imprisoned air to enter the fluid system on coupling, and fluid flow from interconnection only commences when the union nut is sufficiently threaded to prevent fluid loss.

In order that the invention may be more fully understood reference is made to the accompanying drawings wherein a preferred constructional form is illustrated and wherein:—

Fig. 1 is a part sectional elevation of the coupling in its operative condition for fluid flow.

Fig. 2 is a like view as Fig. 1 but the coupling parts are shewn in an uncoupled condition and both pipe terminals sealed.

Referring to the drawings and to Fig. 1, the lower coupling part A, shewn as mounted on a flexible pipe 1, is drawn by union cramp nut 2 into operative position in relation to coupling part B, the latter as shewn being a fixed entity secured to a bulkhead 3. The coupling part A, is a hollow body having ground seating faces 4 and 4a a circumferential flange 5 an off set shoulder 6 and a threaded shoulder 7 and a segmentally curved skirt 8, adapted to grip the substance of the flexible pipe 1, against the support of a headed spigot tube 9 the head 10 being screwed to engage the threaded shoulder 7. Disposed between the head 10 of spigot 9 and the shoulder 6 is the peripheral ring 11 of the spider 12. The spider 12, carries a spring seating and aligning cup 13 perforate at 14 said cup housing spring 15, the latter taking an abutment against the underside of the mobile valve body 16 the latter being guided in its

movement by the walls of cup 13. The said valve 16, is provided with a facing ring 17 the latter being locked in position by a disc 18 screwed to the valve body head 16, or the ring 17 is sprung into a groove the disc 18 being in such case integral with the body of valve 16. The valve facing ring 17 is resilient and made from a vulcanised oil resisting synthetic rubber said valve facing ring contacts in position shewn in Fig. 1 with the ground faced seating 20 of spider ring 31 of coupling part B, and in the position shewn in Fig. 2 with the under face 4a of coupling part A within which part said valve is fitted.

The coupling part B see Fig. 1, consists of a flanged bulkhead spigot 22 externally threaded at 23 for a known type of pipe extension coupling (not shewn) and a spring socket 24 having a boss 25 screwed externally. The coupling body 26, is threaded to engage the boss 25, a packing 27 intervening to make a fluid tight joint. If high fluid pressures are employed the threads may be discontinued at the base of the screwed connection at 25, and the parts spun together. The body 26 has an internally flanged skirt and valve seating 28 operating as a limiting stop by engaging flange 5 of part A when the coupling is operatively assembled.

Integral with the part 22, is a spider 29 carrying a perforate boss 30 within which latter is fixedly mounted the cup seating 31 adapted to engage the face 17 of valve 16. A mobile valve member formed as a flanged sleeve 32 is mounted concentrically of the coupling vertical axis and is adapted to bear upon the upper face of a cup shaped packing ring 33, having a reinforcing metal ring 33a, and act as abutment for spring 34 the upper abutment for said spring being the recess 24 in part 22.

The packing ring 33 is made from resilient oil resistant synthetic rubber, the side wall thereof engaging the inner wall of the body 26 whilst its annular base part is covered by or has incorporated within it the steel or like reinforcing ring 33a to support the inner edge, and provide an even spread of the pressure exerted by the spring 34 through the flange of the valve member 32.

The operation of the invention is as follows:—

The coupling part B in the example shewn, is the anchored part fixedly attached to the bulkhead 3 and is part of the permanent fluid flow system. When uncoupled as shewn in the upper part of Fig. 2 the spring guide 32 under the force of the spring 34 forces the cup washer valve 33, into contact with the valve seatings 28 and 31a, thus sealing the coupling

thereby maintaining the fluid in the pipe and coupling B without loss and without inlet of air. The like operation takes place in coupling part A wherein the mobile resiliently urged valve member 16 is caused to have its face 20 contact with the seating 4a, in the uncoupled state.

In Fig. 1 the coupling is shewn with the component parts A and B locked together in operative engagement by the union cramp nut 2. When coupling takes place the seating 4 of coupling body A engages the underside of valve member 33 simultaneously with valve face 20 of part 31, engaging the seating 20 of spider ring 31. A few turns of the nut 2 now causes the respective valves 33 of part B and 16 of part A to leave their contact with their respective seatings 28 and 31a in the case of part B and 4a in respect of part A. This allows fluid to commence to flow through the coupling, and when the cramp nut 2 reaches the end of its permitted travel by forcing flange 5 of part A into contact with the inner flange of 26 part B the operation is complete, and the respective coupling parts A and B appear as shewn in Fig. 1.

In order to achieve immunity from air inclusion at breaking of the coupling or on recoupling the inverted cup shaped cavity of part 31 may be closed with a diaphragm indicated by dotted lines at 31b in Fig. 2 or if weight be not a material factor the cavity may be dispensed with. Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. A self sealing bipart pipe coupling of the type set forth characterised in that a resiliently faced valve member of the spigot part is adapted to engage a static valve seating of the socket part on coupling, and engage the under face of a double faced fixed seating on said

spigot part when the coupling is uncoupled, the mobile valve member of the socket part being continuously in resilient contact with a reinforced cup shaped resilient mobile packing ring, said ring being adapted to rest upon the upper face of the spigot fixed seating when the coupling is coupled and to support the said continuously contacting valve and engage fixed annular seatings on said socket part to seal and close said socket part when the coupling is uncoupled.

2. A pipe coupling device as claimed in Claim 1 wherein the valve of the socket part is of resilient material having a tapering side for wall engagement and a reinforcing annulus, said annulus being incorporated in the said flexible material.

3. A pipe coupling device as claimed in Claims 1 and 2 wherein the valve member of the socket part has two concentric sealing seatings, the concentric slot therebetween being adapted to be bridged by the reinforced resilient mobile packing ring whereupon the said valve is adapted to engage in a disconnected state, under resilient pressure.

4. A pipe coupling device as claimed in Claim 1 characterised that the socket part has in combination a perforate spider, a spring contacting an abutment surrounding said spider, and a mobile valve under influence of said spring.

5. A pipe coupling device as claimed in Claim 1, having in combination therein an internal flange on the socket part, an external flange on the spigot part, a union cramp nut engaging the flange of the spigot part and the threaded extremity of the socket part said integers cooperating to couple the parts together and establish fluid flow therethrough.

Dated this 27th day of November, 1944.

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